

Remarks/Arguments:

The present invention relates to data transmission and reception using two modulation methods. Specifically, symbols of second modulation level are inserted in a stream contiguous to symbols of a first modulation level.

On page 2, the Official Action rejects claim 4 and 9 under 35 U.S.C. §112. Specifically, the Official Action states that "*the given ratio*" in the last paragraph of claim 4 does not have proper antecedent basis. Thus, Applicants have amended claim 4 to recite "***at a given ratio.***" With respect to claim 9, the Official Action states that the term "*the second modulation method*" and the term "*the first modulation method*" do not have proper antecedent basis. Thus, Applicants have amended claim 9 to recite "***a second modulation method***" and "***a first modulation method.***" Withdrawal of the 112 rejection is respectfully requested.

On page 3, the Official Action rejects claim 1, 5, 9 and 25-28 under 35 U.S.C. §103(a) as being unpatentable over Murakami (U.S. Patent No. 6,993,092). It is respectfully submitted, however, that the claims are patentable over the art of record for at least the reasons set forth below.

Applicants' invention, as recited by claim 1, includes a feature which is neither disclosed nor suggested by the art of record, namely:

the at least one data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method ...

Claim 1 relates to the insertion of a data symbol of a second modulation method directly next (contiguous) to a data symbol of the first modulation method. For example, a 16QAM symbol may be inserted contiguous to a QPSK signal in a data stream without being separated by a pilot symbol. This feature is found in the originally filed application on at least page 16, lines 15-20 and Fig. 2. No new matter has been added.

In Fig. 2, Murakami shows two different types of frames (16QAM frames (201 and 202) and 8PSK frames (203 and 204)). In each of the frames 201-204 the (N) data symbols or (M) data symbols are separated by pilot symbols. This is supported in at least Murakami's Col. 4, lines 35-45 ("*201 is a frame configuration where the modulation ... is 16 level Quadrature Amplitude Modulation ... with a known pilot symbol provided for every N symbols. 202 is a*

frame configuration with a modulation system of information symbol is 16QAM, with a known pilot symbol provided for every M symbols.”). Murakamis’ system is able to switch between the 16QAM frame and the 8PSK frame depending on reception conditions. This is feature is supported in at least Murakamis’ Col. 5, lines 1-12 (“when the level of reception signal is large, frame configuration determination section 101 gives priority to data transmission efficiency on the receiving side and selects the frame configuration of either 201 or 202 in Fig. 2 adopting 16QAM as the modulation system of information symbol. On the other hand, when the level of reception signal is small, frame configuration determination section 101 gives priority to increasing error of resiliency features while sacrificing data transmission efficiency on the receiving side and selects the frame configuration of either 203 or 204 in Fig. 2 that adopts 8PSK as the modulation system for the information symbol”). Murakamis’ frames, however, as shown in Fig. 2 do not have 16QAM symbols that are directly next to or contiguous to the 8PSK symbols (the 16QAM symbols and 8PSK symbols are separated by pilot symbols). Thus, even if Murakami switches between the 16QAM symbols in frames (201 or 202) to the 8PSK symbols in frames (203 or 204), the 16QAM symbols and 8PSK will not be contiguous to one another (they are separated by pilot symbols).

Applicants’ claim 1 is different than Murakami, because a symbol of a second modulation method and a symbol of a first modulation method are placed at position **contiguous** to one another (“the at least one data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method”). As shown in Applicants’ Fig. 2, a transmitted data burst comprises QPSK symbols as well as 16QAM symbols. It is shown that during transmission, a single 16QAM symbol is inserted at a position in a stream of 30QPSK symbols. Specifically, the 16QAM symbol and QPSK signals are contiguous to one another because they are not separated by a pilot symbol. This feature is at least supported in Applicants’ page 16, lines 15-20 of the specification (“the 16QAM method is inserted at the respective centers of data symbol frames modulated by QPSK modulation method”).

It is because Applicants include the feature of “the at least one data symbol of the second modulation method being inserted into the data symbol stream contiguous to a data symbol of the first modulation method”, that the following advantages are achieved. An advantage is that the appropriate modulation method may be chosen in the middle of a stream on a symbol by symbol basis without being separated by pilot symbols. Accordingly, for the reasons set forth above, claim 1 is patentable over the art of record.

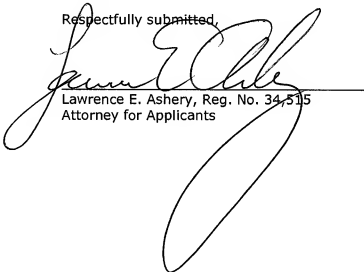
The Official Action also rejects various independent and dependent claims based on combinations of Murakami, Krishnamoorthy, Moon and Shahar. None of these references nor their combinations, however, suggest the features of Applicants' amended claim 1. Thus, the combination of these references is deficient.

Independent claims 2, 3, 4, 9, 25 and 27 have all been similarly amended to claim 1. Thus, these claims are also patentable over the art of record for the reasons set forth above.

Dependent claims 5-8, 10-24, 26 and 28 include all the features of the claims from which they depend. Thus, these claims are also patentable over the art of record for the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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